Proceedings of the Iowa Academy of Science

Volume 56 | Annual Issue Article 21

1949

Hysteriales of Iowa

Bernard Lowy
State University of Iowa

Hysteriales of Iowa

By Bernard Lowy

The Hysteriales of Iowa were last reviewed by Seaver (13) in 1910. The present paper is an extension of that work and includes descriptions of genera and species not previously reported from the state. Seaver recognized four genera with seven species; this review increases the number to five genera with thirteen species.

The order is a heterogeneous one which has undergone considerable taxonomic revision since its delimitation by Saccardo (12), and the fact that it is still not clearly defined is an indication of the need for further careful study. Bisby (2), in a review of the Hysteriales, states that since the members of the group have been considered with equal frequency to belong to the pyrenomycetes and to the discomycetes, their position should be thought of as being transitional between the two groups. More recently, Wolf and Wolf (15) have taken the same view. Ainsworth and Bisby (1) estimate the number of species as about 125 whereas Wolf and Wolf, using a wider concept of the order, give the number as about 670. This is a considerable discrepancy for so small a group but it is characteristic of the differences of opinion which have been expressed concerning the group as a whole. There is still some doubt as to the position which the Hysteriales should occupy in a taxonomic scheme. One of the difficulties lies in the fact that the life histories of most species are only incompletely understood. Lohman (8, 9) has added to our knowledge of the group by a study of the imperfect stages of a number of species in culture. Ellis and Everhart (5) believe the group to be more closely related to the pyrenomycetes than to the discomycetes because of the carbonaceous perithecia and the character of the spores. Divergent interpretations found throughout the literature regarding the taxonomy of the Hysteriales have come about essentially as a result of the difficulty in establishing criteria to be used in assigning a genus to its proper position relative to other closely related forms. This has led to confusion, and in attempts to reach a compromise genera have sometimes been regarded as having equal validity within two families simultaneously. Clements and Shear (3) key the genera *Hypoderma, Hypodermella* and *Hypodermopsis* in both the Hysteriaceae and the Phacidiaceae. Both these families are considered by the same authors as included in the Phacidiales. Martin (10) recognizes the Phacidiales and the Hysteriales as having equal rank and the genera just cited would key out to the

family Phacidiaceae. The affinities of the Hysteriales to certain lichens has been pointed out by Fink (6) who assigns the Graphidiaceae to this order.

HYSTERIALES

Fructifications mostly black and carbonaceous, varying to gray and corky, either free on the substratum from the first or, if sunken in the substratum, becoming erumpent, more or less elongate, usually small, straight or irregularly curved, rarely branched or anastomosing, opening by a narrow longitudinal ostiole.

Rehm (11) recognized five families within the order: The Hypodermataceae, the Dichaenaceae, the Ostropaceae, the Hysteriaceae and, doubtfully, the Acrospermaceae. More recent authors have removed certain of these families to other groups. According to Bisby (2) "if von Hoehnel's contention that *Dichaena* should [not][1] be placed in a separate family, and that the Hypodermataceae, Ostropaceae and Ascrospermaceae all belong elsewhere, should be followed, only the family Hysteriaceae is left of those now usually included in the order." The genus *Dichaena*, the sole representative of the Dichaenaceae, is now known to be an imperfect fungus and is referred to the Sphaeropsidales. The genus *Acrospermum*, the only genus of the Acrospermaceae, is probably to be associated with the Dothidiales. Martin (10) included the four families Dichaenaceae, Ostropaceae, Hysteriaceae and Acrospermaceae in the order, but with the elimination of the first and last families, this leaves but two families. As previously noted, Martin by inference merges the Hypodermataceae with the Phacidiaceae. Both Darker (4) and Tehon (14) regard the Hypodermataceae as a family of the Hysteriales and since these forms fit at least as well into the Hysteriales as in the Phacidiales and since the average collector would be more likely to refer them to the former group than to the latter, it has seemed proper to include them in the Hysteriales in the present treatment. This would include three families in the order, the Ostropaceae, no representative of which has as yet been reported from Iowa, the Hypodermataceae and the Hysteriaceae. Collections of some species have not been abundant, nevertheless workers have frequently stated that their occurrence is more widespread than the number of finds would indicate. The minute size of the fructifications and their black color make their discovery difficult. Limiting this survey to species which have been reported from the state probably means the omission of species which may be expected to occur. Since

1 Manuscript correction by Bisby.

many species are known to be widely distributed, it may reasonably be predicted that forms not yet collected in Iowa but common in neighboring states, will be revealed by more intensive search.

In addition to the papers cited above, Gilman and Archer (7) note the occurrence and distribution of the parasitic species in the state.

This work was done in the mycology laboratory of the State University of Iowa under the direction of Professor G. W. Martin.

Key to the Genera of Hysteriaceae Known to Occur in Iowa

a. Ascocarps at first immersed in the substratum, becoming erumpent; peridium united to overlying host tissue; spores hyaline. (Hypodermataceae). . . . . b

a. Ascocarps superficial from the first; peridium free; spores hyaline to dark. (Hysteriaceae). c

b. Spores thread-like, unseptate. 1. . . . *Lophodermium*

b. Spores spindle-shaped, 3-septate. 2. . . . . *Gloniella*

c. Spores hyaline, 1-septate. 3. . . . . *Glonium*

c. Spores brown or smoky, more than 1-septate. . . . . d

d. Spores transversely septate. 4. . . . . *Hysterium*

d. Spores muriform. 5. . . . *Hysterographium*

1. LOPHODERMIUM Chev. Flor. Par. **1**: 436. 1826.

Hysterothecia immersed, then erumpent, elongate and more or less arched, opening by a narrow longitudinal ostiole; asci clavate, 8-spored; paraphyses slender, slightly hooked at the tips; spores hyaline, thread-like, elongate-clavate, 1-celled, lying parallel in the ascus.

Key to the Species of Lophodermium

a. On deciduous hosts; spores less than 55 μ long. 1. . . . . *L. petiolicum*

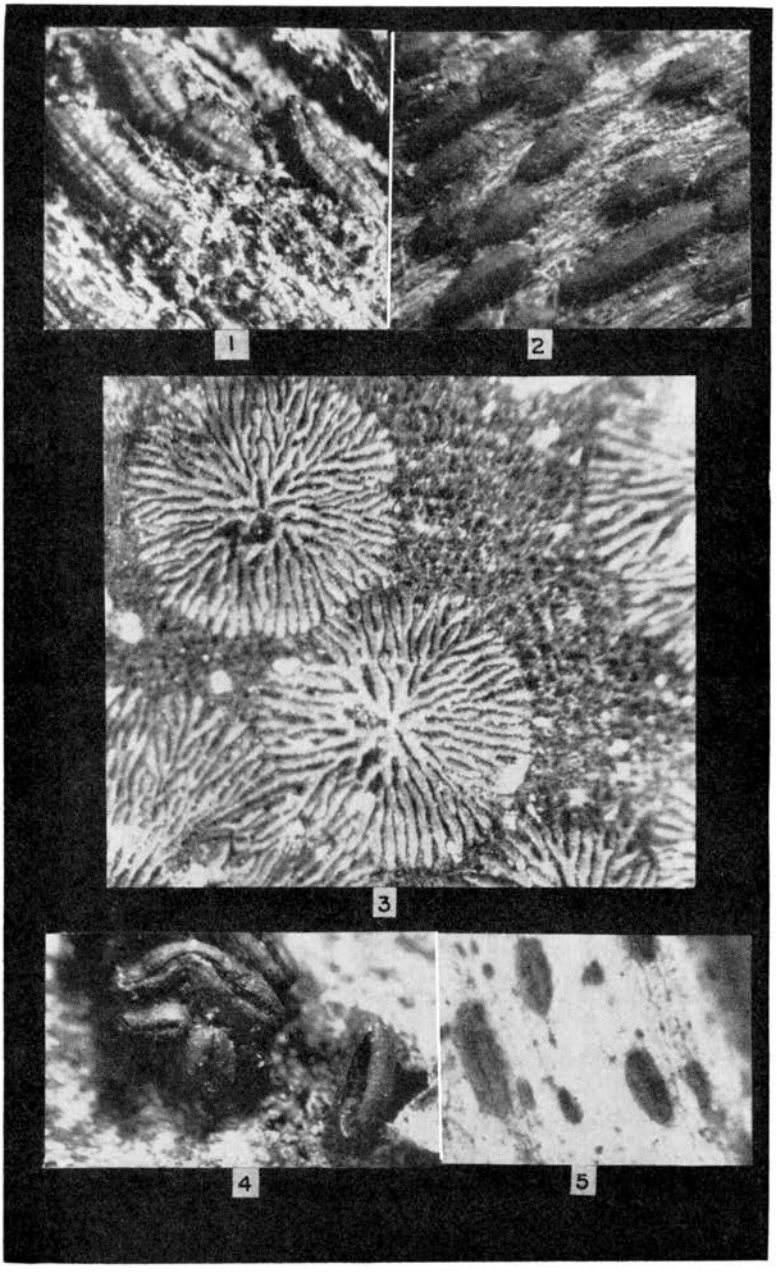
a. On leaves of coniferous hosts; spores 60 μ or more in length. . . . . b

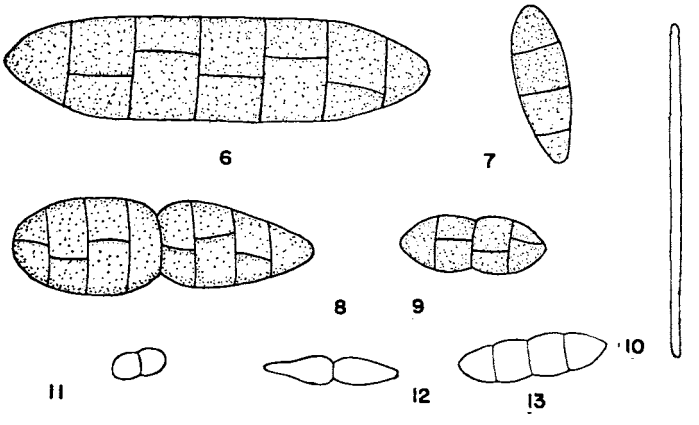
b. On *Pinus*; spores not less then 85 μ long and not exceeding 2 μ wide. 2. . . . . *L. pinastri*

b. On *Juniperus*; spores not less than 60 μ long; between 2 and 3 μ wide. 3. . . . . *L. juniperinum*

1. Lophodermium petiolicum Fuckel, Jahr. Nass. Ver. Nat. **23-24**: 255. 1870.

? *Hysterium punctiforme* Fries, Syst. Myc. **2**: 593. 1823.


1
2
3
4
5



Explanation of Figures

Figures 1-5 reproduced at a magnification of approximately X30; Figures 6-13 at X500.

1. *Hysterographium mori* on bark of *Quercus* sp. A group of hysterothecia showing longitudinal striations and minute cross striations perpendicular to the longitudinal axis.
2. *Glonium parvulum* on bark of *Quercus* sp. showing the parallel striations characteristic of the species.
3. *Glonium stellatum* on rotten bark. The striking, radially branched fructifications are unique among the Hysteriales.
4. *Hysterium pulicare* on bark of *Betula nigra.* A small group of fructifications showing dehiscence by means of the median longitudinal ostiole characteristic of the family.
5. *Lophodermium petiolicum* on petiole of *Rhus glabra.*
6. *Hysterographium vulvatum.* The largest spores of all Iowa species. Transverse septa are variable in number, sometimes as many as fifteen. Constrictions at the septa are rare.
7. *Hysterium pulicare.* Spores are occasionally slightly constricted at the septa.
8. *Hysterographium kansense.* Spores usually deeply constricted at the center.
9. *Hysterographium mori.* This very common Iowa species occasionally has four transverse septa.
10. *Lophodermium petiolicum.* Hyaline, 1-celled, filiform spores are characteristic of the "needle cast fungi."
11. *Glonium parvulum.* The 2-celled hyaline spores of this species show little variation.
12. *Glonium stellatum.* The 2-celled hyaline spores are usually moderately constricted at the center.
13. *Gloniella byssiseda.* Spores are occasionally more pointed at extremities.

? *Hysterium petiolare* Alb. & Schw. ex Fries, Syst. Myc. **2**: 593. 1823.

Figs. 5, 10

Hysterothecia 0.5 — 1.0 x 0.2 — 0.4 mm., separate and in subparallel rows; ostiole prominent, frequently with a distinct rim surrounding its base giving a hat-shaped appearance to the fructification; spores hyaline, filiform, non-septate, 40 — 55 x 1.5 μ.

Type locality: Germany.

Habitat: Dead petioles and veins of various frondose trees and shrubs.

Distribution: Europe, temperate North America. Common in Iowa City on dead petioles and rachis of *Rhus glabra* and *Quercus*.

2. *Lophodermium pinastri* Chev. Flor. Par. **1**: 436. 1826.

Lophodermellina pinastri (Chev.) von Höhn. Ann. Mycol. **15**: 311. 1917.

Hysterothecia separate and in parallel rows, carbonaceous, opening by a longitudinal ostiole; asci cylindrical to clavate, 8-spored; spores filiform, hyaline, non-septate, incased in a gelatinous matrix, 85 — 115 x 1.5 — 2.0 μ.

Type locality: Malmedy, Belgium.

Habitat: On leaves of various species of *Pinus, Abies* and *Picea*.

Distribution: Europe, temperate North America. Common on *Pinus strobus* in Iowa.

3. *Lophodermium juniperinum* de Notaris, Giorn. Bot. Ital. **2**: 6. 1847.

Lophodermina juniperina (Fries) Tehon, Ill. Biol. Monogr. **13(4)**: 96. 1935.

Hysterothecia scattered, elliptical, often with truncated ends, opening by a longitudinal ostiole; asci cylindrical to clavate, 8-spored; spores filiform, hyaline, non-septate, 60 — 100 x 2 — 3 μ.

Type locality: Europe.

Habitat: On various species of *Juniperus, Chamaecyparis* and *Libocedrus*.

Distribution: Europe, temperate North America. Apparently not common in Iowa.

Exsicatti: Sydow, Myc. Germ. No. *1600*..

2. GLONIELLA Sacc. Syll. Fung. **2**: 765. 1883.

Hysterothecia erumpent, oblong to linear, carbonaceous, opening by a narrow longitudinal ostiole; asci clavate, 8-spored; spores

elongate to fusiform, transversely septate, usually 4-celled, hyaline, rarely becoming dark.

KEY TO THE SPECIES OF GLONIELLA

a. Spores narrowly fusiform, less then 4 μ wide.
1. . . . . *G. byssiseda*

a. Spores broadly ovate, 8 μ or more wide.
2. . . . . *G. ovata*

1. Gloniella byssiseda (Crouan) Sacc. Syll. Fung. **2**: 767. 1883.

Hysterium byssisedum Crouan, Fl. Finist. 30. 1867.

Fig. 13

Hysterothecia 1.0 — 2.0 x 0.4 — 0.6 mm., separate, not parallel, opening by a longitudinal ostiole usually reaching the extremities, frequently curved with extremities occasionally pointed; spores hyaline, somewhat constricted at septa, 3-septate, 21 — 23.5 x 3.4 — 3.6 μ.

Type locality: France.

Habitat: Dead wood and bark.

Distribution: Widely distributed. Represented in our collection by a single specimen on bark of *Betula nigra*, Johnson County.

2. Gloniella ovata (Cooke) Sacc. Syll. Fung. **2**: 765. 1883.

Hysterium ovatum Cooke, Grevillea **11**: 107. 1883.

Hysterothecia 0.5 — 1.0 mm. long, 0.3 mm. wide, gregarious, longitudinally striate, opening by a longitudinal ostiole; asci cylindrical to clavate, 8-spored; spores hyaline, becoming 3-septate, 15 — 18 x 8 μ.

Type locality: Southeastern United States.

Habitat: On dead wood.

Distribution: Eastern United States. On *Quercus* bark, Mt. Pleasant, Iowa.

3. GLONIUM Muhl. ex Fries, Sys. Myc. **2**: 594. 1823.

Hysterothecia erumpent, linear, frequently branched, sometimes radially, opening by a longitudinal ostiole; asci cylindrical to clavate, 8-spored; spores hyaline, elongate to clavate, 1-septate.

KEY TO THE SPECIES OF GLONIUM

a. Hysterothecia arranged in stellate groups.
1. . . . . *G. stellatum*

a. Hysterothecia arranged in parallel rows.
2. . . . . *G. parvulum*

1. *Glonium stellatum* Schw. Schr. Nat. Ges. Leipz. **1**: 50. 1822.

Figs. 3, 12

Hysterothecia long, branched, grouped in stellate colonies sometimes reaching 2 cm. or more in diameter, opening by a longitudinal ostiole; asci cylindrical, 8-spored; spores hyaline, 1-septate, constricted at the center, acicular, 23 — 26 x 3.5 — 4.0 μ.

Type locality: Germany.

Habitat: On rotten wood.

Distribution: Europe, North America. Common in wooded areas in Johnson County.

2. *Glonium parvulum* (W. R. Gerard) Sacc. Syll. Fung. **2**: 735. 1883.

Hysterium parvulum W. R. Gerard, Bull. Torrey Club **5**: 40. 1874.

Figs. 2, 11

Hysterothecia 0.3 — 0.5 x 0.2 — 0.3 mm., densely aggregated, rarely branched, separate and mostly parallel, opening by a longitudinal ostiole; asci cylindrical, 8-spored; spores hyaline, ovate, 1-septate, somewhat constricted at the center, 5.0 — 5.5 x 3.0 — 3.2 μ.

Type locality: Poughkeepsie, New York.

Habitat: On old wood.

Distribution: Eastern United States. Common in Johnson County.

4. HYSTERIUM Tode ex Fries, Syst. Myc. **2**: 579. 1823.

Hysterothecia attached by a broad base, elongate to linear, mostly unbranched, opening by a longitudinal ostiole; asci clavate to cylindrical, 8-spored; spores elongate to elliptical, 3-7-septate, 4-8-celled, hyaline at first, becoming brown; paraphyses branched.

KEY TO THE SPECIES OF HYSTERIUM

a. Spores not more than 3-septate. 1. . . . . *H. pulicare*
a. Spores 6-7-septate. 2. . . . . *H. insidens*

1. *Hysterium pulicare* Pers. ex Fries, Syst. Myc. **2**: 579. 1823.

Figs. 4, 7

Hysterothecia 0.7 — 2.0 x 0.4 — 0.8 mm., single or in groups,

straight or somewhat irregularly curved, opening by a longitudinal ostiole which frequently reaches the extremities, prominently raised on substratum; asci clavate, 8-spored; spores brown, 3-septate, scarcely constricted, 23 — 25 x 8.5 μ.

Type locality: Germany.

Habitat: On dead wood.

Distribution: Europe, North America. Common in Johnson County.

2. *Hysterium insidens* (Schw.) Sacc. Syll. Fung. **2**: 778. 1883.

Hysterium insidens Schw. Schr. Nat. Ges. Leipz. **1**: 49. 1822.

Hysterothecia 1.8 — 2.0 x 0.4 — 0.6 mm., separate or aggregated into small groups, straight or slightly curved, erumpent, opening by a longitudinal ostiole; spores brown, occasionally slightly curved, 6-7-septate, 30 — 35 x 8.0 μ.

Type locality: Carolina.

Habitat: On decaying wood.

Distribution: Common throughout eastern United States. On *Ulmus*, Iowa City.

5. HYSTEROGRAPHIUM Corda, Icones Fung. **5**: 34. 1842.

Hysterothecia attached to a broad base, elongate, erumpent, opening by a longitudinal ostiole; asci clavate, 8-spored; spores 1-2-seriate, elliptical to ovoid, hyaline at first, then brown, muriform; paraphyses thread-like, with branched tips.

KEY TO THE SPECIES OF HYSTEROGRAPHIUM

a. Spores large, scarcely constricted, more than 60 μ long.
1. . . . . *H. vulvatum*

a. Spores smaller, moderately to deeply constricted, under 45 μ long. . . . . b

b. Spores deeply constricted at center.
2. . . . . *H. kansense*

b. Spores slightly constricted at center. c

c. Spores large, more than 35 μ long. 3. . . . . *H. fraxini*

c. Spores small, not more than 25 μ long. 4. . . . . *H. mori*

1. *Hysterographium vulvatum* (Schw.) Sacc. Syll. Fung. **2**: 781. 1883.

Hysterium vulvatum Schw. Schr. Nat. Ges. Leipz. **1**: 49. 1822.

Fig. 6

Hysterothecia 0.5 — 0.8 x 0.35 — 0.4 mm., separate, scattered,

opening by a longitudinal ostiole, bearing accessory longitudinal striations with frequent cross-striations; spores brown, not constricted or rarely so, slightly curved, muriform, transversely 7-8(-15)-septate, 64 — 68 x 18 μ.

Type locality: New Jersey.

Habitat: On bark of *Quercus*.

Distribution: Probably throughout temperate North America. Rarely collected. Our single specimen is from Iowa City.

2. *Hysterographium kansense* Ell. & Ev. Erythea **2**: 22. 1894.

Fig. 8

Hysterothecia 0.4 — 0.8 x 0.16 — 0.24 mm., scattered, more or less oblong, longitudinally striate without cross-striations; asci clavate, 8-spored; spores light brown, much constricted at the center, muriform, transversely 8-10-septate, 36 — 43 x 14 — 15 μ.

Type locality: Kansas.

Habitat: On dead bark.

Distribution: North Central United States. Apparently rare in Iowa.

3. *Hysterographium fraxini* (Fries) De Not. Giorn. Bot. It. **2**: 22. 1847.

Hysterium fraxini Fries, Syst. Myc. **2**: 585. 1823.

Hysterothecia 1 — 1.6 x 0.5 — 0.8 mm., elliptical-elongate, massive, with broad longitudinal ostiole, having numerous accessory striations oriented at right angles to longitudinal axis, prominently raised from substratum; asci clavate, 8-spored; spores dark brown, muriform, usually transversely 4-septate, slightly or not at all constricted, with numerous longitudinal septa dividing the spore into many cells, 41 — 45 x 14 — 16 μ.

Type locality: Eastern United States.

Habitat: On old bark.

Distribution: Probably common throughout the United States. On *Fraxinus* sp., Iowa.

4. *Hysterographium mori* (Schw.) Rehm, Ber. Natur. Ver. Augsberg **26**: 90. 1881.

Hysterium mori Schw. Trans. Am. Phil. Soc. II. **4**: 244. 1832.

Figs. 1, 9

Hysterothecia 1.2 — 2.0 x 0.6 — 0.9 mm., erumpent, elongate, separate, parallel, more or less densely aggregated, longitudinally striate with occasional cross-striations, sometimes curved, opening

by a longitudinal ostiole; asci cylindrical, 8-spored, spores brown, muriform, transversely 3-4-septate, slightly constricted at the center, 19 — 22 x 8 — 8.5 μ.

Type locality: Bethlehem, Pennsylvania.

Habitat: On old wood.

Distribution: Common in temperate North America; widely distributed. Common in Iowa.

Literature Cited

1. Ainsworth, G. B. and Bisby, G. R., 1945, A Dictionary of the Fungi. 2nd Edition. The Imperial Mycological Institute. Kew, Surrey.
2. Bisby, G. R., 1923, The Literature of the Classification of the Hysteriales. Trans. Brit. Myc. Soc. **8**: 176-189.
3. Clements, F. E. and Shear, C. L., 1931, The Genera of Fungi. The H. W. Wilson Company.
4. Darker, G. D., 1932, The Hypodermataceae of Conifers. Contr. Arnold Arb. **1**: 1-313. 27 pls.
5. Ellis, J. B. and Everhart, B. M., 1892, The North American Pyrenomycetes. Newfield, New Jersey.
6. Fink, Bruce, 1935, The Lichen Flora of the United States. Ann Arbor, University of Michigan Press.
7. Gilman, J. C. and Archer, W. A., 1929, The Fungi of Iowa Parasitic on Plants. Iowa State Coll. Jour. Sci. **3**: 299-502.
8. Lohman, M. L., 1933, Hysteriaceae. Life Histories of Certain Species. Mich. Acad. Sci. Arts and Letters, **17**: 229-288.
9. Lohman, M. L., 1931, A Study of *Glonium parvulum* in culture. Mich. Acad. Sci. Arts and Letters, **13**: 141-157.
10. Martin, G. W., 1941, Outline of the Fungi. University of Iowa Stud. Nat. Hist. **17**: supp. 1-64.
11. Rehm, H., in Rabenhorst, 1896, Krypt.-Fl. **1**: 1-56.
12. Saccardo, P. A., 1882, Sylloge fungorum **2**: 721-809.
13. Seaver, F. J., 1910, Iowa Discomycetes. Bull. Lab. Hist. State Univ. of Iowa, **6**: 41-219.
14. Tehon, L. R., 1935, A monographic rearrangement of *Lophodermium*. Ill. Biol. Monographs **13(4)**: 1-151.
15. Wolf, F. A. and Wolf, F. T., 1947, The Fungi, Vol. I., John Wiley and Sons, Inc.

Department of Botany
State University of Iowa
Iowa City, Iowa